Orthorectifying QuickBird Data

TUTORIAL

The QuickBird II optical satellite, launched October 18, 2001, offers the highest resolution satellite imagery that is currently available in the commercial market. QuickBird offers panchromatic imagery at up to 0.61m resolution, and multispectral imagery at 2.44m resolution. Data is distributed by DigitalGlobe - www.digitalglobe.com.

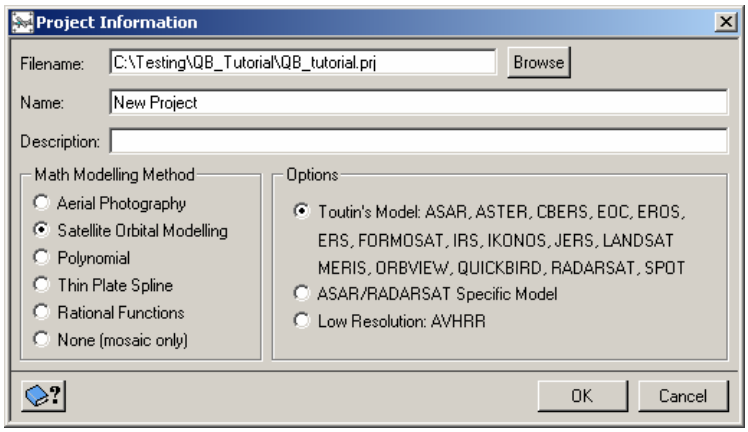
The following is brief tutorial on the use of Geomatica OrthoEngine for orthorectifying QuickBird Basis Imagery with the Rigorous Model and Rational Polynomial Coefficients (RPC).

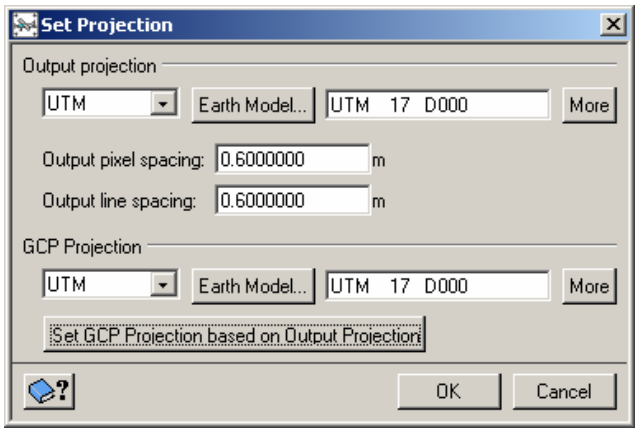
1.0 Rigorous Modeling

The rigorous model is computed with GCPs and tie points.

1.1 Project Setup

Start OrthoEngine, and click New on the File menu to start a new project. Give your project a file name, and select Satellite Orbital Modeling as the math modeling method. Under Options, choose Toutin's Model. After accepting this panel you will be prompted to set up the projection information for the output files, the output pixel spacing, and the projection of your GCPs. Enter the appropriate projection information for your project.



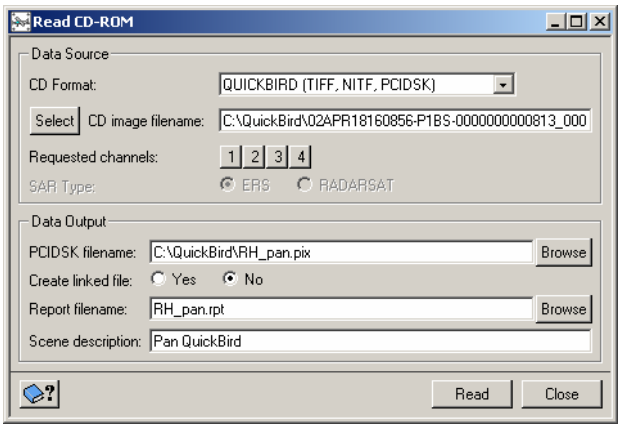


1.2 Data Input

For rigorous modeling with Geomatica OrthoEngine, the user will need to order the “Basic” product, level 1B. “Standard” Imagery Products have a correction already applied, and therefore cannot be orthorectified. For more information on these products, please refer to Digital Globe's website - www.digitalglobe.com.

Data is delivered in Geotiff, NITF 2.0, and NITF 2.1. Geomatica OrthoEngine supports all three of these formats. The data is also delivered with a number of support files (ATT, EPH, GEO, IMD, RPB, and TIL). These support files need to reside in the same directory as the image data when reading the data.

Depending on the media delivery method you choose, you may have to copy or extract your data to your hard drive. After successfully copying your data to your hard drive, proceed to the Data Input processing step. Choose Read CD-ROM data. (Note that we are treating this data as if it is on CD-ROM, even though it is actually on your hard drive.)

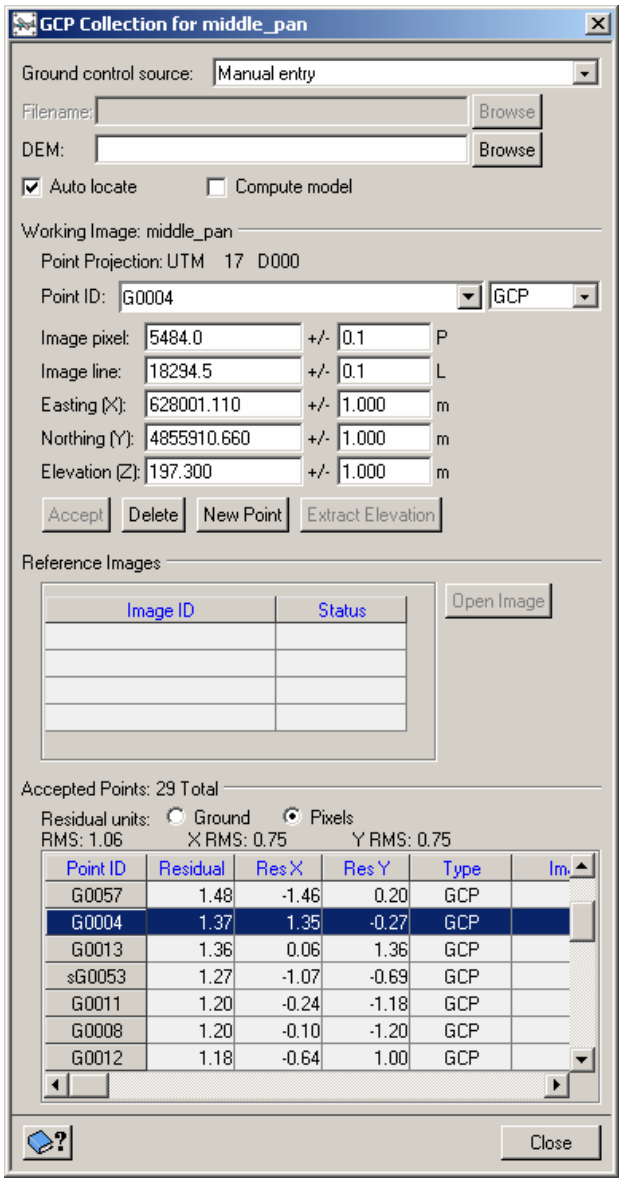


Set CD format to QuickBird, select your Tiff or NITF image file, and press the appropriate channel buttons (1 for a PAN image, or 1-4 for multi-spectral, depending on what was ordered). Specify an output filename, a scene description, and a report file name. This step will convert the file to .pix format, and add the information needed for modeling.

1.3 Collect GCPs and Tie Points

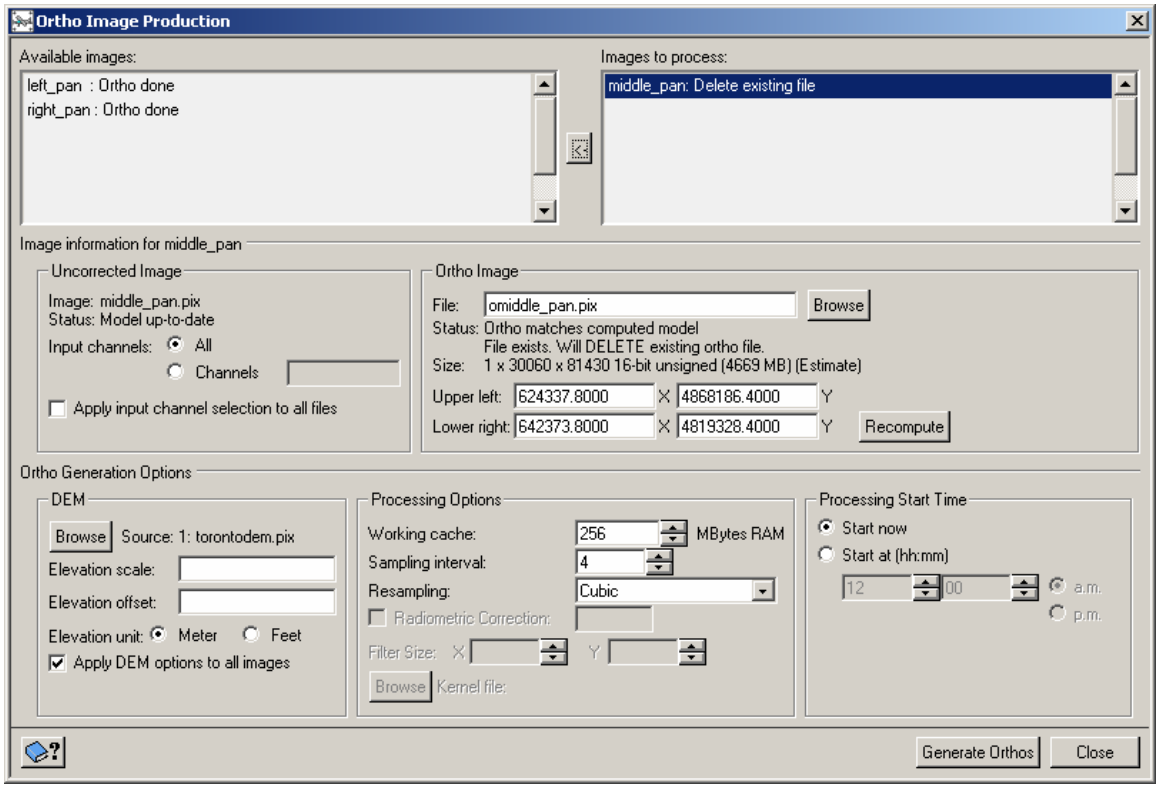
Select the GCP/TP Collection processing step. Collect GCPs for the project using manual entry, from geocoded images, vectors, chip databases, or a text file. You can also collect tie points, if you need to pull multiple scenes together.

For the QuickBird rigorous model you will need a minimum of six accurate GCPs per scene and possibly more, depending on the accuracy of the GCPs and accuracy requirements of the project. Once you have collected your GCPs, run the model calculation and proceed to the residual report panel (under the Reports processing step) to review the initial results.



1.4 Generating Orthos

The final step is to set up your Ortho Image Production. Proceed to the Ortho Generation processing step, select the files to be processed, select the DEM file to be used, set your processing options, and you are ready to create your orthos.

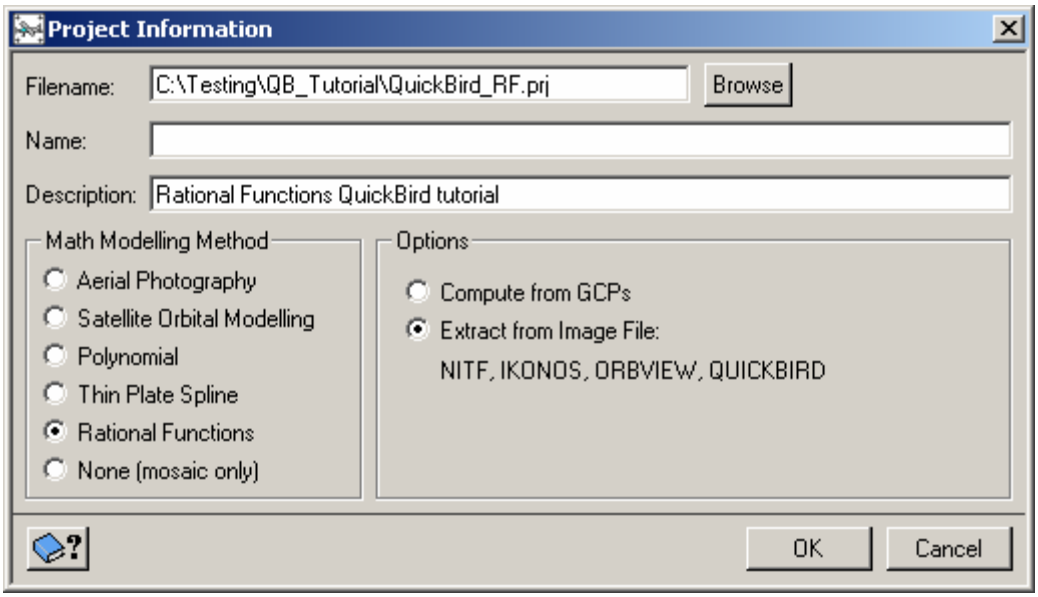


2.0 Rational Polynomial Coefficients (RPC)

QuickBird data is delivered with RPCs, which can be used in the absence of adequate GCPs. The addition of 1-4 GCPs to your project file in addition to the RPCs can greatly improve the accuracy of your final ortho. RPC modeling in OrthoEngine is similar to processing with the rigorous model, but differs in project setup and data input.

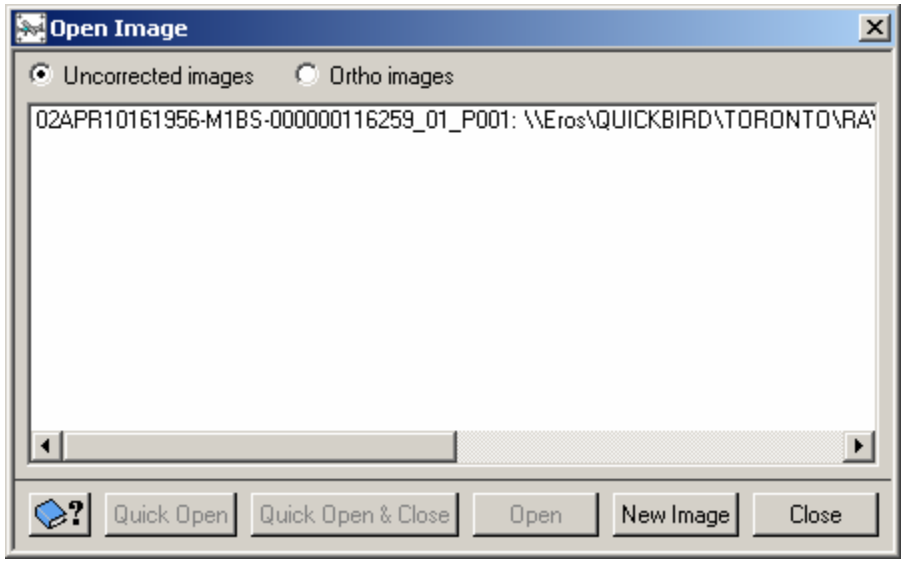
2.1 Project Setup

Start a new project and set the math modeling method to Rational Functions. Under Options, select Extract from Image File. For QuickBird data, the RPCs are actually stored outside the image file (.RBP), but OrthoEngine will seek out this file in the image data directory.

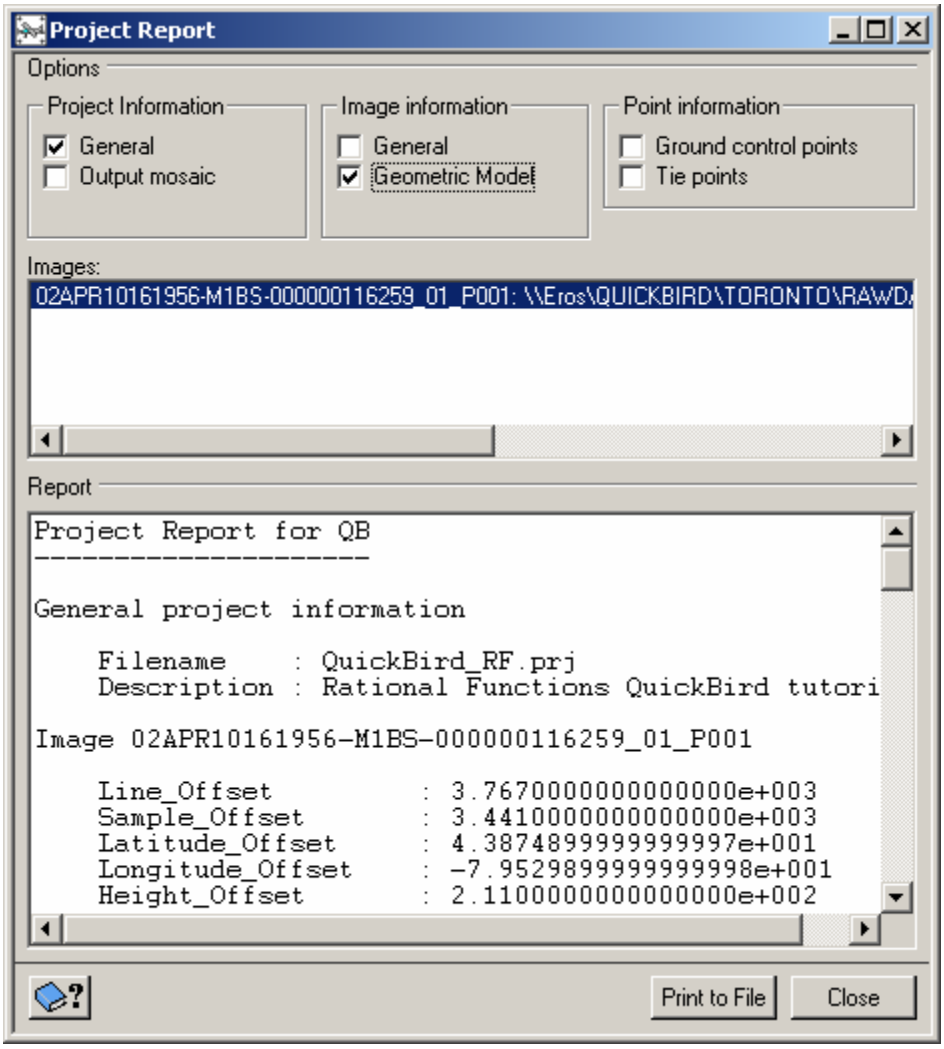


2.2 Data Input

Proceed to the data input window and use the Open Image panel to bring the data into the project with the New Image button. You will select the image file, OrthoEngine will find the .RPB file and add the coefficients to the project.



You can review the coefficients by going to the project report under the Reports processing step. Under Image Information, select Geometric Model.



2.3 GCP Collection

At this point you can proceed right to the ortho generation stage if you do not have GCPs. The model will be computed based on the supplied RPCs. If you do have a few GCPs, you can proceed to the GCP collection stage to add these to your project. The model will be updated automatically, and you can review these GCPs in the residual report panel.

2.4 Ortho Generation

The final step is to set up your Ortho Image Production. Proceed to the Ortho Generation processing step, select the files to be processed, select the DEM file to be used, set your processing options, and you are ready to create your orthos.